

bricated ribs on the posterior slope. The ground-colour of these shells is yellow; and they are dotted with opaque white.

## EXPLANATION OF PLATE XXX.

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|-------------------------------------------------------|----------------------------------------------|
| Fig. 1. <i>Nassa bicallosa</i> .                      | Fig. 14. <i>Pisania solomonensis</i> .       |
| 2. <i>N. trinodosa</i> .                              | 15. <i>Trochus (Gibbula) supragranosus</i> . |
| 3. <i>Fusus imbricatus</i> .                          | 16. <i>Fusus Brazieri</i> .                  |
| 4. <i>Nassa Marratii</i> .                            | 17. <i>Trochus (Clanculus) bathyrhaphe</i> . |
| 5. <i>N. interlirata</i> .                            | 18, 18 a. <i>Adeorbis tenuilirata</i> .      |
| 6. <i>Pleurotoma (—?) solomonensis</i> .              | 19. <i>Rissoina terebroides</i> .            |
| 7. <i>Clathurella immaculata</i> .                    | 20. <i>Trochus (Cantharidus) Huttonii</i> .  |
| 8. <i>Recluzia (?) globosa</i> .                      | 21. <i>Littorina melanacme</i> .             |
| 9. <i>Columbella Carolinæ</i> .                       | 22. <i>Tellina christovalis</i> .            |
| 10. <i>Mitra (Turricula) rufofilosa</i> .             | 23. <i>Thracia Angasiana</i> .               |
| 11. <i>Cythara interstriata</i> .                     | 24. <i>T. Jacksoniana</i> .                  |
| 12. <i>Mitra (Turricula)</i> , var. <i>ficulina</i> . | 25. <i>Maetra pinguis</i> , var.             |
| 13. <i>Cythara unilineata</i> .                       |                                              |

## On the Introduction of Trout and Tench into India.

By FRANCIS DAY, Esq., Surgeon-Major, F.L.S.

[Read April 6, 1876.]

DURING the last few years three attempts have been made to introduce European fish into the rivers and tanks on the Neilgherry Hills in the Presidency of Madras. It may now be assumed that at any rate the Trout (*Salmo leuvenensis*) and the Tench (*Tinco vulgaris*) have bred there, and may prove an eventual success.

The first trial was made by Mr. Thomas, of the Madras Civil Service, who took out a few hundred trout-ova in the 'Ripon' in 1863. From various causes they died prior to reaching India.

In 1866 I made the second attempt. The eggs were obtained for me by Mr. Frank Buckland, and were in an excellent state when packed. This process was performed by myself, as I had previously been instructed by Mr. Youl; and six small boxes of ova were placed, February 2nd, in the ice-room of the P. & O. steamer 'Mongolia' at Southampton. On March 12th, they were landed at Madras. On the 14th they reached the Government Gardens at Ootacamund, where the Superintendent, Mr. M'Ivor, had prepared a very suitable house for their reception. Through it flowed a stream of clear water. Things went on pretty well for

a few days ; but on April 1st a great mortality occurred amongst the ova, and by the 10th the majority were dead.

Fearing the waters of the hills were too warm for the eventual success of European fish, I obtained leave to introduce suitable species from the low country, which was done with considerable trouble.

Mr. M'Ivor was greatly interested in these experiments ; and subsequently, when proceeding to Europe, he determined to try and introduce Trout in another way. Distrusting the ova, he proposed to bring them over in the form of young fish ; and it must be remembered that in those days, as vessels could not go through the Suez Canal, the fish would have to be landed at Alexandria and conveyed in the crowded and inferior railway carriages across Egypt to Suez. He informed me that every one considered failure to be inevitable ; but he adhered to his own views, and I am glad to add that his enterprise, intelligence, and patience have been rewarded by success.

He first had young fish captured and placed in a receptacle through which water ran ; the stream was diminished by degrees and finally cut off, and thus the trout became accustomed to confinement. On board ship the water was constantly oxygenated by being poured from a height, or passed through the rose of a watering-pot or large syringe ; and some of the Trout, Tench, and other Carp reached Ootacamund in safety.

I regret that I have no account of this interesting experiment to offer, especially as I believe it has been published ; but if I ever had a copy, it has been mislaid.

Whilst on the Neilgherry hills for a short time in 1873, I obtained several specimens of Tench (*Tinca vulgaris*, Cuvier) from different localities around Ootacamund ; they were doubtless bred from those Mr. M'Ivor took out to the hills. I did not see any Trout ; and although Mr. M'Ivor promised to send me some from the Koondah streams, he was unable to do so.

"No doubt," observed Mr. M'Ivor, (Feb. 5th, 1873), "all our fish are breeding rapidly, with the exception of the Trout ; and the waters of the Hills will soon be alive with them. The Trout also have produced young ; and we caught some, but not nearly in the number of the other kinds. They, however, seem to be doing well in the Pyjeara and Macoorty streams, although I have not been able to catch any of them there. They should do well in the Koondahs and west side of the Hills. The great quan-

tity of mud washed in heavy rains from the cultivated land on the east side of the Hills will, I fear, render the streams unfit for Trout. We caught several Tench weighing about  $1\frac{1}{2}$  pound, and Rudd\* still heavier."

Mr. H. S. Thomas, of the Madras Civil Service, wrote to me (Jan. 8th, 1876) saying he was despatching a Neilgherry Trout. "It was sent by Mr. M'Ivor in spirit to Mr. Ballard, by whom it was immediately forwarded to me, and overtook me at Coonoor, just as I was going down the Ghât. I took a hurried look for the adipose fin, wrapped him in muslin, and replaced him again in the spirit. The red spots were then bright; a week later they had almost disappeared. I mention this to show that he was clearly fresh when he came to me, and to draw your attention to the spots being *red*,—this latter point, because Mr. M'Ivor told me that, with one solitary exception, the Trout he put into the rivers were all Loch-Leven Trout; in Loch Leven, according to Mr. C. Pennell, the Trout have not *red* spots. Still the spots may have been due to their having been bred in a river, not a lake, for a series of years.

The specimen weighed, out of spirit,  $1\frac{1}{4}$  ounce. Length, from nose to bifurcation of tail, 6 inches, to end of tail  $6\frac{1}{2}$  inches.

*SALMO LEVENENSIS*, Walker, Yarrell.—Loch-Leven Trout, Richardson.—*Salmo cæcifer*, Parnell.

D. 13; A. 11; L. l. 120; L. tr. 26/30.

Length of head  $4\frac{1}{2}$ , of caudal  $6\frac{2}{3}$ ; height of body  $5\frac{3}{4}$  in the total length.

*Eyes*, diameter  $\frac{1}{4}$  of length of head, 1 diameter from end of snout, and  $1\frac{1}{4}$  apart. The width of the head equals its length behind the eyes; its height equals its length, excluding the snout. Thirteen rows of scales between the lateral line and the base of the adipose dorsal fin.

This fish having been well described, it is useless to enter fully on that subject. Respecting its colour, it shows twelve short, vertical, light bars along the middle of the side, or the finger-marks of a young fish. The spots alluded to are now black, whilst Mr. Thomas observes that they were originally red. This is probably due to the fish having been bred in a clear mountain-stream; for the Loch-Leven Trout are said to have no red spots. The colour of the water and the soil through which streams flow exercise great influence on the colours of fishes; but the result in this instance is most interesting.

\* I think these were Gold Carp. The single specimen I saw was *Carassius auratus*.

Whether Trout will permanently succeed in Hindoostan, has yet to be ascertained. None of the Salmonidæ have been discovered south of the Hindoo Koosh, whence Griffith brought specimens.

I may here mention that, having received the collection of fish made by the late Dr. Stoliczka in the recent expedition to Yarkand, I do not find a single specimen of Salmonidæ contained therein; one Siluroid, and the rest Cyprinidæ, comprise the whole.

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On some of the Fishes of the Deccan.

By FRANCIS DAY, Surgeon-Major, F.L.S.

[Read April 6, 1876.]

HAVING received from Dr. A. F. Dobson, of the Madras Medical Service, about 170 fishes collected from the Kistna and its tributaries near the Nizam's station of Hingolie, in the Deccan, as well as a few others from a tank near Bellary, I have thought it might be worth while to offer a few remarks under the above heading.

It is now nearly forty years since Colonel Sykes's paper\* on "the Fishes of the Dukhun" appeared in the 'Transactions of the Zoological Society,' in which the author alluded to forty-six species, remarking that no less than forty-two were new to science.

Dr. Bleeker, in his paper "Beng. en Hind.," gives a list of these fishes, and places them in the genera to which he then considered they belonged. Jerdon (M. J. L. & Sc.) also remarked on a few, expressing his regret that Valenciennes, in the grand 'Histoire Naturelle des Poissons,' had omitted all reference to Col. Sykes's paper.

Dr. Günther, in the 'Catalogue of Fishes in the British Museum,' thus disposes of Sykes's forty-two new species:—six new, eleven previously known, twenty doubtful or omitted, five the genus doubtful.

The only record which I have yet discovered at the India Office respecting Sykes's collection is the following note of presentation:—"July 15th, 1831. Fish, insects, and reptiles in spirit 117;" also "drawings of fish twenty-nine," which being one more than

\* Paper read Nov. 27, 1838.